FLUCTUATING CHARACTERISTICS OF APPLES.

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In taking up the study of fluctuating characteristics in apples, the intention was to show in how far there was a fluctuation of characteristics in apples. The work was carried on at Pullman, Washington, during the years 1909 and 1910.

In the fall of the year as the apples ripened in the orchard of the Washington State College, there was gathered from the trees of fifty different varieties of apples, enough fruit to make one hundred apples of each variety, for use in the investigation. These apples were taken promiscuously from the trees. They were stored in boxes in the cold storage, each box being marked with name and number.

During the winter the apples were cut up for investigation and study. One-half of them were cut lengthwise for a study of the longitudinal outline form; for size; shape, form and size of tube, for shape of core line; depth, size and form of cavity and basin; for position of stamens, and length of stem.

The other half of the apples were cut into cross sections for the study of the core line or fibro vascular bundles; for size, shape and nature of cavities; for cross-section outline; for position form and nature of core.

These halves of the apples were as near as possible true halves. They were inked with indelible pencil on the face in such a way as to have them make clear cut and true impressions of the form and various characteristics of the apples as they were pressed upon paper.

Two impressions were made. The first impression was made on an absorbing paper, making a very strong impression. This was used for making a tracing of the apples. The second impression was made on a fine grained paper, to be used for further study.

The investigation of the fluctuating characteristics of the apples brings out the following:

1. That there is a more or less fluctuation in certain characteristics and that this is true more of certain varieties of apples than of others.

2. That certain varieties of apples show a tendency toward a constancy of characteristics, while others have a great tendency toward fluctuation.

Perhaps the most fluctuating characteristic in all apples is found in size, shape and appearance of the seed cavities.

Second to this comes the fluctuation in the length of the peduncle in any variety.

	Cavities	Size	Form	Lower Basin	Apical Basin	Peduncle	Tube	Core Line	Stamens	Core	Calyx
	%	%	%	%	%	%	%	%	%	%	%
Janet	75	29	56	37	30	49	76	54	25	20	28
North Carolina	80	30	45	44	35	66	82	33	24	61	23
Pickapoo	65	29	45	44	35	67	82	77	49	73	24
Smith	50	33	52	66	88	25	64	32	23	37	25
Limber Twig	57	31	23	12	43	23	76	45	21	21	33
Houghtaling	66	11	77	22	13	10	9	8	32	8	19
Ortley	76	18	41	17	16	28	71	78	31	11	27
Rock	85	89	21	6	41	8	95	39	13	7	9
Jones	76	16	87	31	32	69	86	84	25	27	36
Gold Ridge	68	87	74	68	76	21	22	74	84	73	19
Agrippa	90	75	77	68	81	72	76	92	43	41	28
Nancy Jackson	83	92	84	14	43	24	75	83	19	74	65
Shakleford	69	37	68	67	39	49	63	84	42	77	9
Black Warrior	71	6	9	88	25	86	78	68	14	75	8
Nelson	8	33	85	4	13	93	92	86	10	7	5
Hugenot	57	92	6	95	4	7	8	66	37	53	11
Goin	88	89	58	59	77	84	17	58	76	78	20
Gill	73	76	69	32	21	65	18	86	17	58	21
Duncan	94	17	36	75	85	78	84	75	16	18	22
Stark	77	46	65	66	42	41	61	47	16	89	26
Williams Early Red	63	85	66	39	28	27	84	7	39	87	32
Stone's Eureka	59	13	82	21	32	15	8	18	29	67	26
Nansemond	65	50	48	53	34	43	38	54	65	35	46
Black Annette	14	48	38	53	16	33	38	54	65	46	44
Fink	63	92	37	84	32	24	79	15	96	42	10
Stayman	57	34	24	15	25	26	77	11	39	27	26
Kinnaird	72	54	37	25	43	32	76	85	88	87	13
Red Siberian	45	67	77	43	29	11	27	29	36	27	64
Andrews' Winter	67	77	66	25	28	74	72	61	28	67	26
Crotts	51	96	36	28	19	23	17	18	8	16	9
Red Romanite	54	85	75	23	12	98	86	85	24	35	38
Yates	68	62	74	34	28	69	80	70	42	60	31
Belmont	89	83	90	39	30	81	72	82	47	48	60
Vanoz	78	88	16	37	19	10	11	32	24	60	28
Marshal	85	11	78	88	33	30	20	65	28	86	19
Arabka	70	69	84	35	27	56	65	37	74	46	35
Plumb Cider	53	53	76	35	52	81	20	95	49	63	83
Latah	67	75	18	29	77	32	67	26	34	55	10
Hiley Eureka	66	54	63	27	37	38	64	84	82	53	73
Bomshell	76	53	77	73	83	56	25	73	54	68	26
Rome Beauty	73	83	29	18	20	92	14	13	21	88	15
Indiana Favorite	63	53	27	38	44	28	83	48	47	88	23
Lowver	72	91	85	31	17	78	80	64	62	53	54
Fallen Water	59	90	51	80	69	70	53	72	78	88	55
Lankford	86	60	71	65	39	82	30	74	18	61	38
Lake Winter	58	60	16	10	82	26	77	11	72	31	33
York Imperial	57	94	95	97	38	29	8	14	83	12	10
Loy	84	64	75	88	64	29	84	56	43	58	40
Superior	62	90	16	87	83	36	88	89	19	85	9
Longevity	71	86	74	28	42	28	78	17	29	65	23

Third in line, is the form, size and outline of the apple, and also the core line.

Fourth in rank of inconsistency is the tube, while the stamens, apical and lower basins fluctuate least.

As far as could be observed there is very little fluctuation in shape, size or form of the calyz in any variety of apples.

In general, while there are no two apples exactly alike in any one variety, yet there is a certain similarity running through one variety that makes the apples look alike.

On the following pages is shown in percentages the amount of fluctuation of each variety along the various parts of the apples

The per cent indicated shows the per cent of fluctuation while the negative amount is the per cent of constancy.

In conclusion it might be said that the investigation, if it were continued with all the different varieties of apples that we have, would probably bring out the same facts as have been brought out in the study of these fifty varieties.

There is a slight possibility that where only one variety is grown in an orchard there may not be such a great tendency toward fluctuation of characteristics as there would be in an orchard like the State College of Washington orchard where there are hundreds of different varieties of apples.

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